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10/035,592	10/23/2001	Ramiro Castellanos-Nolasco	013377-0087 (B72683)	2887

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EXAMINER

CHAWAN, SHEELA C

ART UNIT PAPER NUMBER

2625

DATE MAILED: 07/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/035,592

Applicant(s)

CASTELLANOS-NOLASCO ET AL.

Examiner

Sheela C. Chawan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 07 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-8, 11 and 21-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 9, 10 and 12-20 is/are allowed.
- 6) ☒ Claim(s) 1-8, 11, 21 and 25 is/are rejected.
- 7) ☒ Claim(s) 22-24 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2/3/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Response to Amendment***

1. Applicant's amendment filed on April 7, 2005 has been entered and made of record.

Claims 1-25 are pending in the application.

***Response to Arguments***

2. Applicant's arguments see page 7, lines 20- 21 of the remarks, filed 4/7/05, with respect to the rejection of claims 1-25 under 102 and 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Bushroe (US 5,164, 994).

***Information Disclosure Statement***

3. The information disclosure statement (IDS) submitted on 2/3/03 the information disclosure statement is being considered by the examiner.

***Allowable Subject Matter***

4. Claims 9-10, 12-20 are allowed.

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject

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matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1- 8,11 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimura et al., (US. 5,761,337 Listed in IDS 2/3/03), in view of Bushroe (US 5,164, 994).

As to claim 1, Nishimura discloses a system for inspecting components (fig 1, element 1 corresponds to bump) comprising:

axial lighting system the component lighting one or more of component to be located (fig 1, element 8 a light source corresponds to an axial lighting, column 7, lines 1- 26); and

off-axis lighting system illuminating the component off-axis lighting the absence axial lighting (note, axial lighting is turned off during illumination of the solder bump fig 1,

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1) allow component to inspected to locate features (fig 1, element 9 a light source and element 4 ring light a corresponds to off-axis, column 7, lines 27- 36, column 7, lines 47- 57).

Nishimura is silent about an image analysis system receiving image data of the component and analyzing the image data utilizing gradient processing to locate the one or more features.

Bushroe discloses a systems and methods for analyzing images, and more particularly, to system for locating features in an image. The system comprises of:

an image analysis system receiving image data of the component (note, component corresponds to solder joint, see fig 3, is a flow chart of the process steps to detector solder joints, in which detecting features in an image and measuring the intensity of pixels in the image through a window is selected, fig 3, item 36, 38, and 10, column 4, lines 17- 39) and analyzing the image data utilizing gradient (note, gradient process corresponds to the pixel being lighter rather than darker pixel than background . In this case adapted thresholds are set for lower thresholds. Alternatively, an intensity band, rather than an upper or lower threshold, may be set in which case pixels that fall within this band, column 2, lines 11- 49, column 6, lines 63- 68, column 7, lines 1- 6) processing to locate the one or more features (fig 4, is a flow chart showing the process steps to set the adaptive threshold column be set which would simply be an estimated upper limit of the possible intensity value for a joint pixel, using subwindows consists of a square area within the window of nine pixel having a single pixel at its center, column 4, lines 40- 67, column 6, lines 10- 42, 63- 68, column 7, line 1- 6).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Nishimura to include an image analysis system receiving image data of the component and analyzing the image data utilizing gradient processing to locate the one or more features. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Nishimura by the teaching of Bushroe as a result in which the threshold used by the system is adapted for each window to be closely calibrated to the particular intensity of the feature to be analyzed. In this way there is less likelihood of the system mistakenly identifying a nonfeatures, (as suggested by Bushroe at column 2, lines 45- 49).

As to claim 2, Bushroe discloses the system wherein the image analysis system analyzes a single set of the image data to locate or more features (column 4, lines 40- 67, column 6, lines 10- 42, 63- 68, column 7, line 1- 6).

As to claim 3, Nishimura discloses the system wherein image analysis system further comprises feature locator system receiving the image data and generating feature edge data (column 9, lines 41- 67, column 10, lines 1-14).

As to claims 4 and 11, Nishimura discloses the system wherein image analysis system further comprises defect locator system (column 7, lines 37- 46) receiving the image data and generating defect indication data pixel data (column 9, lines 52- 55).

As to claim 5, Nishimura discloses the system wherein image analysis system further comprises protrusion analysis system receiving the image data generating projection size data (column 9, lines 41-51).

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As to claim 6, Nishimura discloses the system wherein the image analysis system further comprises system receiving the image data and generating recess analysis data (column 9, line 62 through column 10, lines 1-14).

As to claim 7, Nishimura discloses the system wherein image analysis system further comprises a missing feature system receiving image data and generating missing feature data (column 9, lines 51-55).

As to claim 8, Nishimura discloses the system wherein the image data further comprises pixel data (column 9, lines 44-51).

Regarding claim 25, argument analogous those presented for claim 1 are applicable to claim 25. Regarding a band analysis system as discloses by Bushroe as follow a band analysis system receiving image data of the component and analyzing the image data to determine whether a band identifies the one or more features (column 4, lines 40- 67, column 6, lines 10- 42, 63- 68, column 7, line 1- 6).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Nishimura to include an image analysis system receiving image data of the component and analyzing the image data utilizing gradient processing to locate the one or more features. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Nishimura by the teaching of Bushroe as a result in which the threshold used by the system is adapted for each window to be closely calibrated to the particular intensity of the feature to be analyzed in this way there is less likelihood of the system mistakenly identifying a non features, (as suggested by Bushroe at column 2, lines 45- 49).

6. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishimura et al., (US. 5,761,337 Listed in IDS 2/3/03), in view of Nichani (US.6,259,827 B1).

Regarding claim 21, argument analogous those presented for claim 1 are applicable to claim 21. Regarding a dual lighting analysis as discloses by Nichani as follow dual lighting analysis system analyzing image data of the component created when the axial lighting system and the off-axis lighting system are both illuminating the component and generating component acceptance data (column 4, lines 4-18, column 5, lines 5- 15).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Nishimura to include a dual lighting analysis system analyzing image data of the component created when the axial lighting system and the off-axis lighting system are both illuminating the component and generating



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component acceptance data. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Nishimura by the teaching of Nichani. This reduces the risk that the object will be moved between acquisitions and, thereby, removes the need to register the images (as suggested by Nichani at column 6, lines 42- 44).

### ***REMARKS***

7. Applicant's arguments regarding independent claim 21, have been fully considered with respect to the art rejection, the examiner has carefully considered applicant's argument, but firmly believes the cited reference to reasonably and properly meet the claimed limitation. The examiner does not agree with the remarks that Nichani cannot be said to suggest or teach "dual lighting analysis system analyzing image data of the component created when the axial lighting system and the off-axis lighting system are both illuminating the component and generating component acceptance data (see column 4, lines 4-18, column 5, lines 5- 15). However, applicant is reminded that the claim language is given its broadest reasonable interpretation.

### ***Allowable Subject Matter***


8. Claims 22-24 are objected would be allowable if rewritten to overcome the objection set fourth in this office action and to include all of the limitations of the base claim and any intervening claims.

**Contact Information**

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheela C Chawan whose telephone number is. 571-272-7446. The examiner can normally be reached on Monday - Friday 7.30 - 4.00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Sheela Chawan  
Patent Examiner  
Group Art Unit 2625  
June 22, 2005